



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

APPLEBY

Serial No.: 09/051,070

Atty. Ref.: 36-1201

Filed: April 2, 1998

Group Art Unit: 2123

Examiner: Phan, T.

For: TRAINING APPARATUS AND METHOD

August 21, 2002

APPEAL BRIEF

Assistant Commissioner for Patents
Washington, DC 20231

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Technology Center 2600

Appellant hereby appeals the Final Rejection of March 26, 2002.

REAL PARTY IN INTEREST

The real party in interest is the assignee, British Telecommunications public limited company, a corporation of Great Britain.

RELATED APPEALS AND INTERFERENCES

The Appellant, the undersigned, and the assignee are not aware of any related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF THE CLAIMS

Claims 1-16 and 20-30 remain pending in this application. Claims 1-16 and 20-30 stand rejected by the Examiner, the rejections of which are appealed.

STATUS OF ANY AMENDMENT FILED SUBSEQUENT TO FINAL REJECTION

No Amendment under Rule 1.116 has been filed in response to the March 26, 2002 Final Rejection.

The claims as presented in the Appendix to this brief are as amended by the Amendments filed on January 16, 2002, July 27, 2001, January 19, 2001 and April 2, 1998.

CONCISE EXPLANATION OF THE INVENTION

The present invention relates to a computer system and method for training a user, and in particular, a system and method of training a user to write and/or speak in a foreign (i.e., target) language using simulated transactions (e.g., grocery shop scenario). The system includes a computer terminal 10 which communicates with a host computer 20 (see Fig. 1). Input text in the target language is entered by a user on terminal 10 (see Fig. 4A). This input text is forwarded to host computer 20 which provides feedback of several types (e.g., a positive or negative expression on the face of a displayed character) to be visually displayed on screen 108 of terminal 10 (see Figs. 4B-4D). For example, if the input text can be understood, a positive expression of the character will be displayed (see Fig. 4B). If the input text can be understood but contains recognized spelling or grammatical errors, visual feedback is given in the form of a confirmation of what the transaction should be as output text. If the input text cannot be understood because one or more words (after spell correction) cannot be recognized, a negative expression of the character is displayed and output text in the target language is generated to question the unrecognized words (see Fig. 4C).

Host computer 20 comprises a communications port 202 which enables communication with terminal 10, a central processing unit 204 and a store 206 (see Fig. 5). Store 206 contains a lexical database 208, a rules database 210, a transaction table 214, a response table 216 and a buffer 220. Lexical database 208 comprises a plurality of word records 208a-208n each comprising, for example, the word itself in the target language, the syntactic category of the word (e.g., whether it is a noun, pronoun, verb) and values for a number of standard features of the word (e.g., the gender of the word). Rules database 210 comprises a plurality of rules 210a-210n each specifying a rule of syntax structure of the target language. Transaction table 214 comprises a number of entries 214a-214n relating to specific information about transactions relating to the particular scenario being simulated. Response table 216 comprises a plurality of entries 216a-216b each corresponding to one type of output control message generated by host computer 20, and storing, for that output, the anticipated types of response. Buffer 220 stores the last few system outputs as high level semantic structures.

In order to detect simple errors in the input text, at least some of the rules stored in rules database 210 comprise a first rule which specifies those agreements (e.g., gender and number) which are grammatically necessary for the corresponding syntactic structure to be correct, but also a plurality of relaxed versions of the same rule, in each of which one or more of the agreement constraints is relaxed. For example, for a first rule 210a which specifies correct agreement of both gender and number, there are associated relaxed rules 210b and 210c, the first of which (relaxed rule 210b) corresponds to rule 210a but lacks the requirement for an agreement of gender, and the second of which (relaxed rule 210c) also corresponds to rule 210a but lacks the requirement for an agreement of number. Input text is first parsed using the strict rule and, where parsing using the strict rule is unsuccessful, the

relaxed rule(s). When the input text is successfully parsed by a relaxed rule but not by a corresponding strict rule, the grammatical error determined to be present in the input text is that corresponding to the constraint that was relaxed in the relaxed rule.

In operation, after receiving input text from terminal 10, host computer 20 will scan the input text to determine whether it relates to one of the transactions in a predetermined stored list. Whether all of the information necessary for that transaction is complete is then determined. If so, visual feedback including a returned control message from host computer 20 will be displayed on display device 108 of terminal 10 to indicate that all of the information necessary for that transaction is complete. Host computer 20 spell corrects and parses the input text for apparent errors of spelling or grammar, and causes the returned control message to include the indicated errors. Grammatical errors can be detected using the strict and relaxed rules as noted above. Host computer 20 also generates user guidance text indicating, in the source language, useful information about the target language dialogue.

A buffer 220 stores the most recent system outputs from host computer 20 is stored as high level semantic structures in buffer 220. By referring to buffer 220, it is possible to determine what system output the input text is attempting to respond to, and using the response table 216, to assess the likeliest types of response and (by reference to syntactic categories table 218) the likely syntactic form in which the anticipated responses will be expressed.

CONCISE EXPLANATION OF THE ISSUES PRESENTED FOR REVIEW

Whether claims 1-16 and 20-30 are anticipated under 35 U.S.C. §102(e) by Fujisawa et al. (U.S. '062, hereinafter "Fujisawa").

Whether claims 28-29 are anticipated under 35 U.S.C. §102(b) by Berger et al. (U.S. '981, hereinafter "Berger").

Whether claims 28-29 are anticipated under 35 U.S.C. §102(e) over Carbonell et al. (U.S. '785, hereinafter "Carbonell").

WHETHER THE CLAIMS STAND OR FALL TOGETHER

With respect to the rejection over Fujisawa, claims 1, 4, 6-16, 21-24 and 26-29 stand or fall together and do not stand or fall with any other claim.

With respect to the rejection over Fujisawa, claims 2, 3, 5 and 20 stand or fall together and do not stand or fall with any other claim.

With respect to the rejection over Fujisawa, claims 25 and 30 stand or fall together and do not stand or fall with any other claim.

With respect to the rejection over Berger, claims 28 and 29 stand or fall together and do not stand or fall with any other claim.

With respect to the rejection over Carbonell, claims 28 and 29 stand or fall together and do not stand or fall with any other claim.

The specific reasons for each of the above groups of claim(s) standing or falling together or alone is provided below in the section entitled "Arguments with Respect to the Issues Presented for Review."

ARGUMENTS WITH RESPECT TO THE ISSUES PRESENTED FOR REVIEW

Claims 1-16 and 20-30 are not anticipated under 35 U.S.C. §102(e) by Fujisawa.

For a reference to anticipate a claim, each element must be found, either expressly or under principles of inherency, in the reference. Appellant respectfully submits that Fujisawa fails to disclose each element of the claimed invention. For example, Fujisawa fails to disclose storing data representative of messages output by an output device, determining

whether an input is an allowable response to a most recent one of the messages, and if not, determining whether the input is an allowable response to a preceding message as required by independent claim 1 and its dependents. Similar comments apply to independent claims 24, 28 and 29 and their respective dependents.

Through the above feature, an exemplary system of the present invention is capable of storing not only the most recent question asked but also at least one previous question. The system thus has the capability of interpreting a user's input as containing information relevant to a previous question if it is determined that the user's input is not relevant to the most recent question. (See, e.g., page 15, lines 5-11 of the specification.)

Accordingly, the system of the present invention is useful where the user is responding to a message (e.g., question) from the system. In contrast, the invention disclosed by Fujisawa appears to be primarily useful when the system is responding to questions from the user. For example, Fujisawa teaches "This invention relates to knowledge based information retrieval system and in particular to a human interface of an intellectual query system permitting the end user to query efficiently information stored in a network structure in an electronic file (emphasis added)." (See col. 1, lines 14-18.) Fujisawa further teaches "A first object of this invention is to solve the problematical points as described above and to enable the end user to query desired information from a description by a natural language even on the basis of fragmental memory (emphasis added)." (See col. 2, lines 14-18.) Accordingly, Appellant respectfully submits that one skilled in the art would not have been motivated to even modify the system disclosed by Fujisawa to provide a system or methodology whereby the user's input is examined to see whether it is an allowable response not only to the most recent system output but also to see whether it might be an allowable

response to an earlier system output if the user's input is not relevant to the most recent system output.

The Final Office Action alleges that Figs. 1 and 16, col. 12, lines 20-40, col. 15, lines 47-63, and col. 26, line 12 to col. 27, line 22 of Fujisawa discloses this claimed feature. (See pages 5-6 of the Final Office Action.) Appellant has reviewed each of these specifically identified figures and passages and respectfully disagrees. For example, col. 12, lines 20-26 merely discusses the output of a lexical analysis of three words "personal computer companies" (words 401, 402 and 403 illustrated in Fig. 8). Col. 15, lines 47-63 generally discusses a program for interpreting a sentence written in a natural language, where the program "consists of an input section 501 for inputting a series of words from the user, a lexical analysis section 503 for analyzing of each of the words in the series, a syntactic analysis unit 504 for analyzing the syntax, referring to a grammar file 514 storing syntax rules, and a nominal compound interpretation unit 506." None of these passages or figures discloses examining the user's input to see whether it is an allowable response not only to the most recent output but also to see whether it might be an allowable response to an earlier system output if the user's input is not relevant to the most recent system output.

Page 6, lines 3-7 of the Final Office Action states "Fujisawa also disclosed the lexical analysis determined a match response or allowable response as claimed (col. 12, lines 20-26) to a current or most recent of the message, and if not matching, the analysis module (lexical) will move the concept matching process (window) to previous input message from concept tree window for analysis and display for user...(emphasis added)." Appellant notes that the above claimed feature requires the storage of the most recent and previous system output messages so that a later user input message can be checked against previous system output messages. Accordingly, it appears that the Final Office Action expresses a misunderstanding

of the claimed invention. That is, the present invention involves storage of system output messages, not a “previous input message” as apparently suggested in the Final Office Action.

With respect to independent claim 2 and claims 3, 5 and 20 which depend therefrom, Appellant submits that Fujisawa fails to disclose “a rule store containing rules specifying grammatically allowable relationships...wherein said rule store contains first rules comprising criteria specifying correct relationships between words of said lexical store, and associated with said first rules, one or more second rules each corresponding to one of said first rules but with one relationship criterion relaxed, said processor processing said input dialogue using both said first rules and second rules.” The Final Office Action states, “As per claim 2, due to the similarity of claim 2 to claim 1, and Fujisawa additionally anticipated a plurality lexical rules for known natural languages conversion such as English, Japanese, etc., and relationships of these rules for conversation (col. 2, lines 56-67, col. 5, lines 9 to col. 13, line 14, for example).” (See page 3, lines 11-14 of the Final Office Action.) While the Final Office Action therefore discusses Fujisawa’s disclosure of a plurality of lexical rules, Fujisawa fails to disclose “one or more second rules each corresponding to one of said first rules but with one relationship criterion relaxed.”

The Final Office Action states “Fujisawa also taught rule tree window with subsumption relations (col. 29, lines 14-17) for relaxing rules as claimed in query subconcepts (col. 28, line 35 to col. 29, line 42), for example.” (See page 6, lines 15-16 of the Final Office Action.) Appellant has reviewed these passages specifically identified in the Final Office Action and respectfully submits that none of them discloses the above feature required by claim 2. These portions of Fujisawa describe imposing restrictions on a current concept by allowing the user to click the series of letters of the current concept in the query editing window by means of a mouse. (See col. 27, lines 22-25 of Fujisawa). Specifically, as

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described in col. 28, line 35 to col. 29, line 42, the current concept “COMPANY” 1412 displayed in concept tree window 1403 may be changed by clicking the previous concept “ORGANIZATION”. Further, col. 28, line 35 to col. 25, line 42 (specifically identified in the Final Office Action) discusses changing a current concept of “ORGANIZATION” to another concept “COMPANY” by clicking the appropriate series of letters using a mouse. The concept of organization as it relates to company does not involve any grammatical rules, let alone grammatical rules corresponding to another rule but with one relationship criterion relaxed or a processor (not a user clicking a mouse) processing input dialog using strict and relaxed rules. Fujisawa thus fails to anticipate claim 2.

Claims 25 and 30 depend from claims 24 and 1, respectively. Claims 25 and 30 are thus allowable for at least the reasons discussed above with respect to base independent claims 24 and 1. Specifically, Fujisawa fails to disclose examining a user’s input to see whether it is an allowable response not only to the most recent system output but also to see whether it might be an allowable response to a previous system output if the user’s input is not relevant to the most recent system output. Additionally, Appellant respectfully submits that Fujisawa fails to disclose a rule store for storing rules specifying grammatically allowable relationships between input words, wherein the rule store stores first rules comprising criteria specifying correct relationships between words of a lexical store and, associated with the first rules, one or more second rules each corresponding to one of the first rules but with one relationship criteria relaxed as required by claims 25 and 30 for similar reasons discussed above with respect to independent claim 2.

Accordingly, Appellant therefore respectfully requests that the rejection of claims 1-16 and 20-30 under 35 U.S.C. §102(e) be reversed.

Claims 28-29 are not anticipated under 35 U.S.C. §102(e) by Berger or under 35 U.S.C. §102(e) over Carbonell.

Like Fujisawa, Berger and Carbonell each fails to disclose storing data representative of messages output by an output device, determining whether an input is an allowable response to a most recent one of the messages, and if not, determining whether the input is an allowable response to a preceding message as required by independent claims 28 and 29. Indeed, the Final Office Action fails to even allege any detail regarding how Carbonell discloses the above feature. Since Berger discloses non-dialogue (i.e., non-user interactive) input of text being translated and output, Berger fails to disclose even the possibility of responding to a “previous one of the messages”. (See claim 29.) If the rejection over Berger or Carbonell is maintained, Appellant respectfully requests that the Examiner specifically point out what (i.e., what column(s), line number(s) and/or what Figure(s)) discloses this particular feature.

Accordingly, Appellant respectfully submits that neither Berger nor Carbonell discloses all of the claimed limitations required by claims 28-29. Appellant therefore respectfully requests that the rejection of claims 28-29 under 35 U.S.C. §102 be reversed.

CONCLUSION

For all of the reasons set forth above, it is respectfully requested that this appeal be granted and that the rejections discussed above be reversed.

Respectfully submitted,

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APPENDIX OF CLAIMS ON APPEAL

1. Training apparatus for training a user to engage in transactions with another person whom the apparatus is arranged to simulate, the apparatus comprising:
 - an output device for outputting of messages to a user;
 - an input for receiving input from the user;
 - a lexical store containing data relating to individual words of said input;
 - a rule store containing rules specifying grammatically allowable relationships between words of said input;
 - a transaction store containing data relating to allowable transactions between said user and said person, said data defining, for said output messages, types of allowable inputs from said user;
 - an output message buffer for storing data representative of the most recent message output by the output device and at least a preceding one of said messages output from the output device;
 - a processor having at least read access to the lexical store and the rule store, said processor being arranged to process the input by comparing the input with the words contained in said lexical store and with the relationships specified by the rules contained in said rule store, in order to recognize the occurrence in the input of words contained in said lexical store and in the relationships specified by the rules contained in said rule store, and, in dependence upon said recognition, to generate output indicating when correct input has been recognized; and wherein said processor is further responsive to the data contained in the message buffer and the transaction store to:
 - (a) determine whether said input is an allowable response to a most recent one of the output messages represented by data stored in the output message buffer; and

(b) if said input is not determined to be an allowable response to a most recent one of the messages, determine whether said input is an allowable response to a preceding message represented by data stored in the output message buffer;

an output device for making the output available to the user so that said user can be trained to engage in transactions with another person.

2. Training apparatus for training a user to engage in transactions with another person whom the apparatus is arranged to simulate, the apparatus comprising:

an input for receiving input dialogue from a user;

a lexical store containing data relating to individual words of said input dialogue;

a rule store containing rules specifying grammatically allowable relationships between words of said input dialogue;

a transaction store containing data relating to allowable transactions between said user and said person;

a processor having at least read access to the lexical store, the rule store and the transaction store, said processor being arranged to process the input dialogue by comparing the input dialogue with the words contained in said lexical store, with the relationships specified by the rules contained in said rule store, and with the data specified in the transaction store, in order to recognize the occurrence in the input dialogue of words contained in said lexical store, in the relationships specified by the rules contained in said rule store, in accordance with the data specified in the transaction store, and, in dependence upon said recognition, to generate output dialogue indicating when correct input dialogue has been recognized; and

an output device for making the output dialogue available to the user so that said user can be trained to engage in transactions with another person;

wherein said rule store contains first rules comprising criteria specifying correct relationships between words of said lexical store, and, associated with said first rules, one or more second rules each corresponding to one of said first rules but with one relationship criterion relaxed, said processor processing said input dialogue using both said first rules and second rules.

3. Apparatus according to claim 2, wherein said relationship criteria correspond to agreements between words.

4. Apparatus according to claim 1, in which the processor is arranged to generate output responsive to input, and to detect recognized errors in said input, and, on detection thereof, to indicate said recognized errors separately of said responsive output.

5. Apparatus according to claim 2, in which said processor is arranged to detect said recognized errors on detection of input dialogue containing words which meet said second, but not said first, rules.

6. Apparatus according to claim 1 which is arranged to provide language training, in which said rules, said words, and said output are in a training target language, and further arranged to generate user guidance in a source language for said user and different to said target language.

7. Apparatus according to claim 6 in which the user guidance comprises guidance as to the meaning of the output.

8. Apparatus according to claim 6 in which the user guidance comprises an explanation of any detected errors in the input.

9. Apparatus according to claim 6 in which the user guidance indicates suitable further input which could be provided.

10. Apparatus according to claim 1 in which said input and/or said output comprise text.

11. Apparatus according to claim 1, in which said input comprises speech, and further comprising a speech recognizer arranged to recognize the words of said speech.

12. Apparatus according to claim 1 in which said output comprises speech, said apparatus further comprising a speech synthesizer.

13. Apparatus according to claim 1, further comprising a user interface arranged to accept said input and make available said output to the user.

14. Apparatus according to claim 13, in which said user interface comprises a display and in which said output is displayed on said display.

15. Apparatus according to claim 6, in which said user interface comprises a display to display said output and user guidance is normally not displayed on said display, and further comprising an input device via which a user may selectively cause the display of said user guidance on said display.

16. Apparatus according to claim 13, in which said user interface is located remotely from said processor and is coupled thereto via a communications channel.

20. Apparatus according to claim 3, wherein said agreements between words comprises agreements of gender or agreements of number.

21. Apparatus according to claim 1, further comprising an inflection store operatively coupled to said lexical store.

22. Apparatus according to claim 21, wherein each record in said lexical store contains a pointer to one of records in said inflection store.

23. Apparatus according to claim 21, wherein the number of records in the inflection store is smaller than the number of records in the lexical store.

24. An interactive dialogue apparatus for dialogue with a user, the apparatus comprising:

an output device for outputting messages to the user;

an input device for receiving input from the user;

a lexical store for storing data relating to individual words;

a rule store for storing rules specifying grammatically allowable relationships between words of said input;

a processor for processing said input to recognize occurrence in the input of words stored in said lexical store and in the relationships specified by the rules stored in said rule store;

an output message buffer for storing data representative of a plurality of messages output to said user; and

a transaction store for storing data defining, for each of said messages, a type of allowable response;

said processor being responsive to an input from said user, to the data stored in the output message buffer and to the data stored in the transaction store to:

(a) determine whether said input is an allowable response to a most recent one of the messages represented by data stored in the output message buffer; and

(b) if said input is determined not to be an allowable response to a most recent one of the messages, determine whether said input is an allowable response to another one of the messages represented by data stored in the output message buffer.

25. Apparatus according to claim 24, wherein said rule store stores first rules comprising criteria specifying correct relationships between words of said lexical store, and, associated with said first rules, one or more second rules each corresponding to one of said first rules but with one relationship criterion relaxed, said processor processing said input using both said first rules and second rules.

26. Apparatus according to claim 24, wherein the processor is arranged to generate output responsive to input, and to detect recognized errors in said input, and, on detection thereof, to indicate said recognized errors separately of said responsive output.

27. Apparatus according to claim 24, said apparatus being arranged to provide language training, in which said rules, said words, and said output are in a training target language, and further being arranged to generate user guidance in a source language for said user and different to said target language.

28. A method of operating an interactive dialogue apparatus for simulating dialogue with a user, the method comprising:

- outputting messages to the user;
- receiving input from the user;
- storing data relating to individual words;
- storing rules specifying grammatically allowable relationships between words of the input;
- processing said input to recognize occurrence in the input of words related to stored data and relationships specified by the stored rules;
- storing message data representative of a plurality of messages output to the user; and
- storing data defining, for each of the output messages, a type of allowable response;
- determining whether an input is an allowable response to a most recent one of the stored messages represented by stored message data; and

if the input is not determined to be an allowable response to a most recent one of the messages, determining whether the input is an allowable response to another stored message represented by stored message data.

29. An interactive dialogue apparatus for dialogue with a user, the apparatus comprising:

an output device for outputting messages to the user;
an input device for receiving input from the user;
a processor for processing said input;
an output message buffer for storing a plurality of messages output to the user; and
a transaction store for storing a type of allowable response for each of the messages output to the user;

wherein the processor determines whether the input is an allowable response to a most recent one of the messages output to the user, and if not, determining whether the input is an allowable response to a previous one of the messages output to the user.

30. Training apparatus according to claim 1, wherein said rule store stores first rules comprising criteria specifying correct relationships between words of said lexical store, and, associated with said first rules, one or more second rules each corresponding to one of said first rules but with one relationship criterion relaxed, said processor processing said input using both said first rules and second rules.